



Texas Department of Health

Voluntary Indoor Air Quality Guidelines
for
Public Schools

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Voluntary Indoor Air Quality Guidelines for Public Schools

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§297.1. General Provisions.

(a) Purpose. Chapter 385 of the Health and Safety Code, Indoor Air Quality in School District Buildings, requires the Board of Health (board) to establish voluntary guidelines for indoor air quality (IAQ) in public schools, including guidelines for ventilation and indoor air pollution control systems. The department developed these guidelines to help schools provide a healthier environment for students and staff. The intent is to provide the schools the guidance for the major conditions that affect IAQ in schools.

(b) Scope. These are voluntary guidelines for public schools. The department does not have any enforcement authority requiring implementation of these guidelines. They do not create liability for a school board for an injury caused by the failure to comply with the voluntary guidelines established by the board under Health and Safety Code, §385.003.

These guidelines are very general in nature and are not intended to provide detailed information on improving IAQ. Presently, there are insufficient health and technical data to issue more specific guidelines. Additional information on IAQ and a list of other resources for more information can be provided by the Indoor Air Quality Branch of the department. There are several sources available which offer guidance to schools on the development of an IAQ Management Plan, and which provide forms which can be used or modified to fit the needs of individual public school districts.

The needs, costs and available funding for improving the IAQ vary greatly in public school districts. School administrators should evaluate, and adopt or promote those guidelines that in their judgement, are relevant, applicable and feasible to implement. It is important to realize that these guidelines are presented as a best management practice that the department is encouraging schools to strive for.

If portions of these guidelines conflict with any applicable building codes or other laws, then such laws take precedence over these guidelines. It is the responsibility of each public school district and other users of these guidelines to comply with applicable laws including but not limited to, those related to building, plumbing, electrical and mechanical systems, fire protection, safety, energy use, and environmental protection.

(c) Severability. Should any section or subsection of this chapter be found to be void for any reason, such finding shall not affect all other sections.

§297.2. Definitions.

The following words and terms, when used in these sections, shall have the following meanings, unless the context clearly indicates otherwise.

(1) Acceptable indoor air quality - That quality of air in an occupied enclosed space that is within an established temperature and humidity comfort zone, and which does not contain air contaminants in sufficient concentration to produce a negative impact on the health and comfort of the occupants.

(2) Air contaminant - A gaseous, liquid, or solid substance or combination of substances in a form transported by or in air that has the potential to be detrimental to human health.

(3) Board - The Texas Board of Health

(4) Building commissioning - The process of ensuring that all building systems are installed, functionally tested, and operated in conformity with design intent. Commissioning includes

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planning, design, construction, start-up, owner acceptance, and training throughout the life of the systems and building.

(5) Department - The Texas Department of Health.

(6) HVAC system - The heating, ventilation, and air-conditioning system.

(7) IAQ - Indoor Air Quality. The quality of air in an occupied enclosed space.

(8) IAQ coordinator - A designated person at the school or school district level who provides leadership and coordination of IAQ activities. The responsibilities should include coordination of an IAQ team, preparation for emergency responses, dissemination of IAQ information, tracking of IAQ complaints and direction of responses, and communication of IAQ issues and status to interested parties.

(9) IAQ management plan - A written set of steps for preventing and resolving IAQ problems.

(10) Indoor air pollution - The presence, in an indoor environment, of one or more air contaminants in sufficient concentration and of sufficient duration to be capable of causing adverse effects to human health.

(11) Microbials - Agents derived from, or that are, living organisms (e.g., viruses, bacteria, fungi, and mammal, bird and dust mite antigens) that can be inhaled and can cause adverse health effects including allergic reactions, respiratory disorders, hypersensitivity disorders, and infectious diseases. Also referred to as "microbiologicals" or "biological contaminants."

(12) Negative pressure - A condition that exists when the air pressure in an enclosed space is less than that in the surrounding areas. Under this condition, if an opening exists between these locations, air will flow from surrounding areas into the negatively pressurized space. A negatively pressurized building will have air flow from the outside into the building through available openings.

(13) Positive pressure - A condition that exists when the air pressure in an enclosed space is greater than that in the surrounding areas. Under this condition, if an opening exists between these locations, air will flow from the positively pressurized space into surrounding areas. A positively pressurized building will have air flow from the building to the outside through available openings.

(14) Preventive maintenance - Regular and systematic inspection, cleaning, and replacement of worn parts, materials and systems. Preventive maintenance helps to keep parts, materials, and systems from failing by ensuring they are in good working order.

(15) Public school - A building owned by a public school district or leased by a public school district for three months or more that is used by the district for a purpose that involves regular occupancy of the building by students.

§297.3. Recommendations for Implementing a School IAQ Program.

(a) Initial program development. The development of a school IAQ program should include the following considerations.

(1) IAQ Coordinator. An IAQ coordinator should be appointed to manage the IAQ program.

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(2) **IAQ assessment.** An IAQ assessment of all facilities should be performed to identify and document problem areas. Operational and maintenance needs that can be addressed immediately, and in the future, should also be identified and documented.

(3) **Development of goals.** Based on the results of the IAQ assessment and resources available, each public school district should develop goals which must be achieved for the implementation of an effective IAQ program.

(4) **Public school board/administrative support for stated goals.** Administrative support from the highest level of the organization and a written commitment from the school board, superintendent, and other key personnel to the goals is necessary for an effective IAQ program.

(5) **Funding.** Adequate budgets are necessary for IAQ staff to meet the stated goals. The amounts of funding will vary based on the scope of each public school district's program.

(6) **Staff.** An IAQ support team should be developed as necessary to achieve the district's goals. The team may include administrators, health officials, custodians and maintenance personnel, an energy manager, design and construction staff, teachers, parents, students and others.

(b) IAQ management plan. A written IAQ management plan should be developed and maintained. The plan should include the following.

(1) **Training.** Education and training of the IAQ coordinator and support team, teachers, staff and students on the recognition, prevention and resolution of IAQ problems, as appropriate.

(2) **Communication.** A procedure for communicating with students, parents, faculty, and staff regarding IAQ issues.

(3) **Complaint response.** A written procedure for documenting and responding to IAQ complaints and problems.

(4) **Record keeping.** An IAQ complaint collection, resolution, and records retention program.

(5) **Maintenance and operation plan.** A written building maintenance and operation plan containing: a written description of the building systems and building functions and occupancy, schematics and/or as-built drawings with equipment locations and performance criteria, outside air requirements, sequences of operation, daily building and system operation schedules, test and balance reports, maintenance schedules, building inspection checklists and maintenance equipment checklists. The plan should be updated annually.

(6) **Implementation schedule.** A schedule to implement the management plan.

(7) **Annual review.** Annual IAQ inspection/review of facilities including a walk through by the IAQ coordinator or designee.

(c) School board review. A review of the IAQ program status and future needs should be presented annually to the School Board by the IAQ coordinator.

§297.4. Design/Construction/Renovation.

(a) Building design (new construction). The following factors should be considered during the planning and design stages.

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(1) New buildings. Design and construction standards that facilitate the maintenance of acceptable IAQ should be established.

(2) Site selection. During the selection of building sites, consideration should be given to minimizing or designing to avoid potential contaminant sources. Some of these considerations include the following.

(A) Environmental assessment. An environmental assessment of property to identify on-site contamination that could affect indoor air quality should be conducted.

(B) External contaminants. Potential external contaminant sources such as combustion products (freeways or power plants), dust generators (agricultural or cement plants), and industrial plants that may emit pollutants into the air should be identified.

(C) Climate. Climate assessment data that include factors affecting building layout and other architectural design considerations such as elevation and prevailing winds should be developed and evaluated.

(D) Radon. A radon assessment of the site should be conducted, if applicable.

(E) Drainage. Conduct a drainage survey to assure water can be diverted from the building site.

(3) Architectural design.

(A) Building structure factors. Factors that can affect IAQ, such as the shape and size, orientation, layout, proximity to pollution-generating activities, building materials, types of windows and doors, ventilation system design, location of air intakes and exhausts, and susceptibility to pest intrusion should be considered.

(B) Internal contaminant sources. Proper venting to the outside atmosphere of pollution source areas, such as science laboratories and preparation rooms, housekeeping and material storage, restrooms, workshops, cooking areas, art and hobby rooms, computer rooms, copy rooms, and other emission-producing spaces should be provided.

(C) Moisture prevention. Condensation, water vapor intrusion, and other moisture problems in the building should be avoided through the proper design and installation of the building components.

(D) Space allocation.

(i) Adequate space for maintenance access and proper operation of building equipment, such as HVAC system equipment and boilers, should be provided.

(ii) Separate rooms for materials and chemical storage that are kept under negative pressure and vented to the outside atmosphere should be provided.

(E) Building materials and furnishings.

(i) The lowest chemical-emitting building materials and furnishings that are practical should be used. Contaminant-emitting and retention potential of furnishings, floor and wall coverings and casework should be evaluated. Emissions data from manufacturers should be evaluated before specifying or approving products.

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(ii) Materials that prevent (or at least inhibit) microbial growth without occupant exposure to potentially harmful chemicals should be used.

(iii) The use of porous or fleecy materials is discouraged where unmanaged excessive moisture or improper maintenance occur.

(iv) Projected life cycles and recycling of materials should be considered.

(v) Maintenance requirements should be considered. Materials that can be easily cleaned with the least toxic cleaning supplies should be utilized when possible.

(vi) Proper storage and protection of building materials to prevent water-damage before or during their installation should be provided.

(4) HVAC system design. HVAC systems should be designed to include the following.

(A) Air intakes. Sufficient fresh outside air to maintain a healthy environment in all occupied areas should be provided.

(B) Air distribution. Proper air distribution should be provided to all occupied areas.

(C) Filters. Medium to high efficiency filtering systems for respirable particulates should be used.

(D) Access doors/ports. Convenient access doors/ports to facilitate inspection, maintenance and cleaning of air handling units and ducts should be provided.

(E) Coils. Coils with adequate heating and/or cooling capacity and with features to facilitate maintenance should be used.

(F) Drain pans. Insulated drain pans with proper drainage to prevent standing water should be installed on all new cooling (wet) coils.

(G) Drain traps. Drain traps should be properly installed when drain lines from condensate pans connect to sewer systems.

(H) Ducts. Ducts with internal surfaces that are easily cleaned, not damaged by typical cleaning methods, do not harbor dust and microbials, and that will not emit materials or gases that can harm the occupants should be provided on all new HVAC systems.

(I) Return air. Ducting of return air is recommended.

(J) Positive building pressure. The wall cavities and rooms of the buildings should be maintained at a net positive pressure with respect to the outside atmospheric pressure.

(K) Exhaust systems. Adequate exhaust systems for restrooms, storage rooms, copy rooms, animal areas, chemistry labs, computer rooms, industrial arts rooms, kilns, home economics rooms, locker rooms/showers, swimming pools and other areas with contaminant sources should be provided. These areas should be under negative pressure with respect to adjacent classrooms, offices and hallways.

(i) Exhausts should be vented directly to the outside.

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(ii) Exhaust vents should be located to avoid contaminants being drawn back into the building.

(L) Comfort. Adequate temperature and humidity control should be provided to maintain comfort in all occupied areas.

(M) Humidity. Humidity should be maintained throughout the year to prevent mold growth.

(N) Air diffusers. Air diffusers should be used to manage air flow volumes and patterns to manage for occupant comfort.

(b) Maintaining acceptable IAQ during renovation. Building occupants should be protected from fumes and dust during renovation.

(1) Hazardous chemicals and substances. Hazardous chemicals as defined in the Health and Safety Code, §502.003(13), and hazardous substances as defined in the Health and Safety Code, §361.003, should be managed and disposed of in a safe and legal manner.

(2) Scheduling. Occupant exposure to contaminants should be minimized by scheduling renovation when school is not in session.

(3) Isolation. Ventilation and barrier control strategies to isolate construction areas from the occupied areas should be used.

(4) Water-damage. Porous building supplies that become water-damaged should be discarded.

(5) Re-occupancy. All renovated areas should be thoroughly cleaned and ventilated prior to re-occupancy.

(c) HVAC system testing. For new construction and major remodeling, the HVAC systems in those areas should be tested and balanced by an independent certified contractor.

(d) Commissioning of building. Building commissioning should be provided by trained and knowledgeable technicians to assure proper operation of all building systems.

§297.5. Building Operation and Maintenance Guidelines.

(a) Written preventive maintenance program. A written preventive maintenance program should be established for each public school to provide a healthy learning environment. The program should include the following.

(1) Filters. A system filter change out should be developed and implemented. A filter upgrade program should be implemented if the filters do not meet the latest recommended efficiency.

(2) Coils and condensate drain systems. A cleaning program of the coil and condensate drain systems of the HVAC systems should be developed and implemented.

(3) Cleanliness. The air supply and return systems and mechanical rooms should be kept clean and properly maintained.

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(4) Sewer traps. A sewer trap maintenance program should be developed and implemented to prevent sewer gas back drafts into buildings.

(5) Records. A written maintenance record program should be developed and implemented.

(6) Maintenance requirements. Adherence to product manufacturers maintenance requirements should be required as a minimum.

(b) Training. Personnel should be educated and trained in the prevention, recognition, and resolution of IAQ concerns.

(c) Housekeeping.

(1) Storage. Air handling rooms should not be used for storage.

(2) Supplies. Maintenance and operational supplies should be kept in order and properly labeled in a clean, dry room to prevent contamination of the air and infestation of insects and rodents.

(3) Cleaning procedures. Cleaning procedures and equipment should be selected to be effective and to minimize airborne dust.

(d) HVAC systems.

(1) Outside air. The HVAC systems should be operated to provide acceptable outside air with quantities in conformance with the most current and accepted standard, up to the equipment capabilities. Placement of outside air intakes should take into consideration potential external sources of contamination.

(2) Positive pressure. The HVAC systems should be operated to provide a positive building pressure to reduce the entry of contaminants, and provide more effective temperature and humidity control.

(3) Moisture control. The HVAC systems should be operated to prevent excessive moisture that could cause microbial growth or high humidity.

(4) Ducts.

(A) Inspection. Periodic visual inspection of ducts for mold, dirt and deterioration should be performed.

(B) Cleaning. Cleaning of ducts internally lined with fibrous or soft material that can be damaged by mechanical cleaning devices is discouraged. Replacement of these types of contaminated lined ducts is preferred.

(C) Replacement. Ducts with internal surfaces that are easily cleaned, not damaged by typical cleaning methods, do not harbor dust and microbials, and that will not emit materials or gases that can harm the occupants should be used when a duct is repaired or replaced.

(D) Cleaning methods. The ducts should be cleaned using methods that will not expose occupants to potentially harmful substances.

(5) Drain pans. Condensate drain systems should be free of microbial growth and other

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debris. The condensate pan should drain completely so there is no standing water.

(6) Exhaust air. Exhaust air systems should be operating properly and vented to the outside.

(7) Preconditioning. The HVAC systems should be operated for sufficient time prior to building occupancy to remove contaminants and to condition the air.

(8) Access. If existing access to the HVAC systems does not allow proper inspection and maintenance, access ports should be installed.

(e) General operations and maintenance.

(1) Scheduling. Schedule and conduct maintenance activities with high emissions (painting, roofing repair, pesticide applications) to minimize occupant exposure to indoor air contaminants.

(2) Animals and plants. Live animals and plants should be maintained in a healthy and clean condition.

(f) Microbial management.

(1) Water intrusion. Damaged building systems or components that cause water condensation or water leaks in the building should be promptly repaired.

(2) Water damage. Remove or dry, preferably within 24 hours, porous materials such as carpets and padding, ceiling tiles, sheet rock, and insulation that become water-damaged. Major water damage or flooding should be remediated by qualified personnel.

(3) Cleaning/replacement. Promptly clean or replace materials contaminated with mold or other substances that may affect IAQ. Contaminated porous materials should be replaced.

(4) Management. Microbial growth on surfaces or in water reservoirs is unacceptable and should be removed using procedures to avoid dissemination and worker/occupant exposure. Appropriate steps should be taken to prevent future growth in these locations, without causing occupant exposure to potentially harmful chemicals.

(g) Sanitation considerations.

(1) Sewage backups. Building occupants should be removed from any area flooded by sewage. The cleanup should ensure rapid decontamination (to include water extraction, cleaning and disinfection) and drying of all wet surfaces. Contaminated porous materials should be replaced, preferably with non-porous materials.

(2) Wild animals. Birds, bats and other wild animals should not be allowed to roost in or otherwise enter occupied buildings, including attics or plenums or in or near fresh air intakes. Areas contaminated with urine and feces should be decontaminated. Protection for building occupants and workers should be required during the process.

(h) Cleaning products.

(1) Toxicity. The least toxic cleaning products needed to accomplish the goal should be used.

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(2) Directions. Follow manufacturers' directions for cleaning products. The use of excessive amounts of cleaning materials can cause unacceptable IAQ.

(3) Training. Assure that all personnel using cleaning products with hazardous chemicals have been trained in the proper usage and handling of such products as required by the Texas Hazard Communication Act, the Health and Safety Code, §502.009.

(4) Labeling. The public school employer shall follow the labeling requirements of the Health and Safety Code, §502.007.

(5) Ventilation. Adequate ventilation during and immediately after use of cleaning products should be used to minimize exposure to potentially harmful or irritating substances in the products.

(6) Scheduling. Schedule the use of cleaning products when building is unoccupied to minimize exposure to students, staff and other occupants.

(i) Pesticide use.

(1) Pest management, for both building and lawn care, should emphasize nonchemical management strategies whenever practical, and least toxic chemical controls when pesticides are needed.

(2) Pest management must be in accordance with the Structural Pest Control Act, Texas Revised Civil Statutes, Article 135b-6, §4J and 22 Texas Administrative Code, §595.11.

(3) When contracting for pest control services, the use of businesses that conform to 22 Texas Administrative Code, §595.14 Reduced Impact Pest Control Services, is preferred.

(4) Dead pests should be promptly removed from the premises.

(j) Emergencies. An emergency response plan, including staff training, should be developed for chemical spills, dangerous air contamination, and similar events.

(k) Records.

(1) Material safety data sheets. A public school employer shall maintain a legible copy of the current Material Safety Data Sheet for each hazardous chemical used in the workplace including those in cleaning supplies, pesticides and art supplies in accordance with the Health and Safety Code, §502.006.

(2) Workplace chemical list. The employer shall prepare a workplace chemical list if required by the Health and Safety Code, §502.005.

(3) Facility chemical list. The employer shall prepare a facility chemical list (also known as a Tier Two report) if required by the Health and Safety Code, §506.006.

§297.6. Recommended Building Occupant Responsibilities.

(a) Cleanliness. Classrooms and teaching supplies should be kept clean and orderly to prevent contamination of indoor air and conditions conducive to insect or rodent infestations.

(b) Product usage. Products such as pesticides, air fresheners, scented products, and other materials that may be a health concern, should not be used.

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(c) Classroom activities. Use the least toxic instructional materials (markers, glue, art supplies, etc.) that will serve the intended purpose. When classroom activities/projects generate air pollutants, steps should be taken to minimize impact, such as using local exhaust fans or opening windows.

(d) Diffusers and grilles. Supply air diffusers and return air grilles should be kept free and clear of any obstructions.

(e) Spills. Spills should be cleaned up promptly and properly. Spills of hazardous chemicals must be disposed of in accordance with all applicable state and federal laws.

(f) Pets. Classroom pets should be maintained in such a manner to prevent IAQ problems.

(g) Sensitive individuals. Carefully consider and, to the extent feasible, accommodate the needs of sensitive individuals by the following.

(1) Consulting. Teachers of student(s) with allergies or chemical intolerances should consult, as necessary, student(s), parents, school health officials, and with written parental consent, their physicians.

(2) Locating. Locate sensitive individuals away from potential sources of symptom-triggering substances and activities.

(3) Discouraging. Discourage the use of scented personal care products or other scented products that may cause adverse reaction in sensitive individuals.

(h) Food. Food should be stored in airtight containers and refrigerated if necessary.

(i) Garbage. Waste containers should be stored properly, emptied regularly, and located away from air intakes or other sensitive areas.

(j) Smoking. Smoking tobacco is prohibited in public schools under the Penal Code §48.01(a).

(k) Portable air cleaning devices. Portable air cleaning devices may be of limited help in cleaning a small area. They must be properly maintained to be beneficial.

(l) Ozone-generating devices. Ozone-generating devices should not be used in occupied spaces. Ozone is a lung irritant.

(m) Reporting. Promptly report IAQ problems/complaints to the IAQ coordinator or designee.

(n) Medical care. Any building occupant experiencing chronic or serious health problems is encouraged to seek appropriate medical care, and work with medical professional(s) in management of the illness.